



Operations Monitoring Report

Second Quarter FY17

Prepared by:

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I. Executive Summary

A review of the fiscal year 2017 (FY17) Second Quarter performance and contract obligations between Constellation New Energy (CNE) and the Metropolitan Government of Nashville and Davidson County (Metro) is presented in this report by Thermal Engineering Group, Inc (TEG). The status of the available funds for all active capital construction and repair and improvement projects are also presented. For the fiscal year 2017 to date, CNE has satisfactorily met all of the contract obligations to Metro and has had no contract violations.

For the Second Quarter FY17, the chilled water sales increased 2.9% over the previous Second Quarter (FY16). The chilled water sendout also increased 3.4% over the previous Second Quarter. The system losses increased approximately 15.6%. The number of cooling degree days increased 111.1% in the Second Quarter. The peak chilled water demand for the current quarter was 14,177 tons, which is approximately 1% higher than the previous Second Quarter.

Steam sendout for the current quarter increased by approximately 17.7% over the previous Second Quarter with a 29.6% increase in heating degree days. Likewise, steam sales also increased by approximately 24.3% over the previous Second Quarter. Steam system losses, as a percentage of sendout, decreased, and the total losses decreased approximately 16% over the previous Second Quarter. The peak steam demand for the current quarter was 126,156 pounds per hour, which represents an increase in the Second Quarter demand by approximately 22.4%.

The EGF performance continues to satisfactorily meet the System Performance Guarantee (Guaranteed Maximum Quantity or GMQ) levels. The chilled water plant electric consumption continues to perform lower than the guaranteed levels; however, it has increased by 2.7% in the Second Quarter over the previous Second Quarter. The steam plant electric consumption increased over the previous Second Quarter by 24.9%, and the amount of electricity per unit of sales of steam remained approximately the same. The total water consumption for the steam and chilled water plants increased 7.2% from the previous Second Quarter. However, the EDS make-up for the chilled water system increased 38.9%. The steam plant water usage increased by 38.2%.

Work continued on DES Capital and Repair & Improvement Projects during the Second Quarter of FY17. Repair and Improvements to the EDS continue as scheduled. DES131 was closed during the Second Quarter FY17. Construction was completed on DES121 and DES128 during the Second Quarter FY17, and it is anticipated that they will be closed during the Third Quarter FY17. DES122 and DES134 were bid and awarded during the Second Quarter FY17. DES137 (Cordell Hull New CHW Valves) was opened during the Second Quarter FY17.

The current fiscal year system operating costs to date are \$11,064,171. This value represents approximately 54% of the total budgeted operating cost for FY17. The customer revenues from the sales of steam and chilled water for FY17 (to date) are \$9,231,725 which is approximately 49% of the budgeted amount. The difference between the operating costs and customer revenue is the Metro funding amount (MFA), which represents the shortfall in cash flow for the system.

The MFA transferred to date for FY17 is \$861,000 (50% of budget). However, the actual MFA required cannot be accurately calculated due to outstanding invoices.

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II. Energy Distribution Sales and Performance

A. Chilled Water

This section of the report discusses and presents performance information regarding the operation of the EGF for the periods described. Charts and tabular data are also presented to provide a more detailed description of the actual EGF performance.

1. Sales and Sendout

A comparison for the Second Quarter chilled water sales is shown in Figure 1. This data reflects a 2.9% increase in sales for the current quarter over the same quarter of the previous fiscal year.

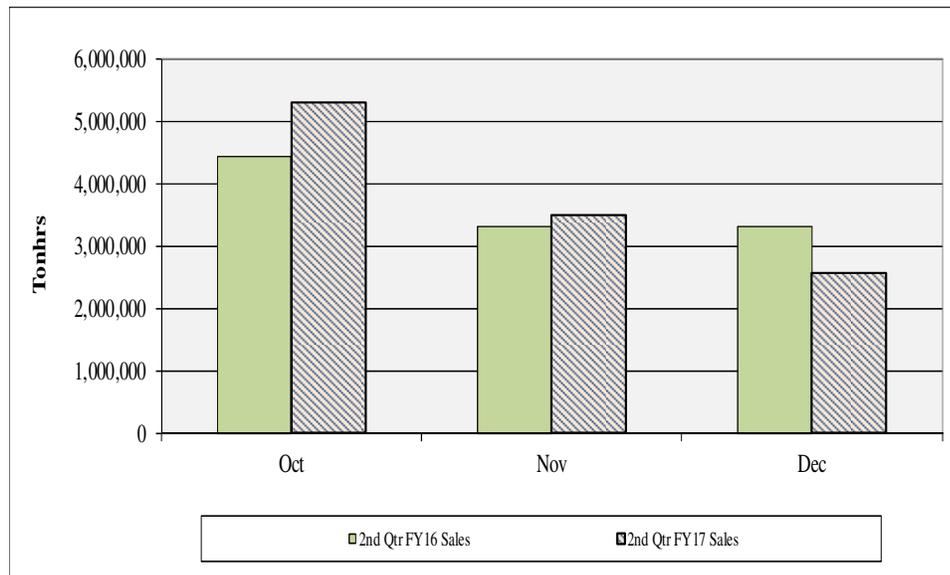


Figure 1. Chilled Water Sales Comparison

The peak chilled water demand for the current quarter was 14,177 tons, which represents an approximate 1% increase over the previous Second Quarter.

Figure 2 shows the chilled water sales, sendout and losses for the previous twelve months. The losses on this figure are defined as the difference in tonhrs per month between the recorded sendout and sales values and represent the total energy loss for chilled water in the EDS. The number of cooling degree days per month are also tracked for comparison.

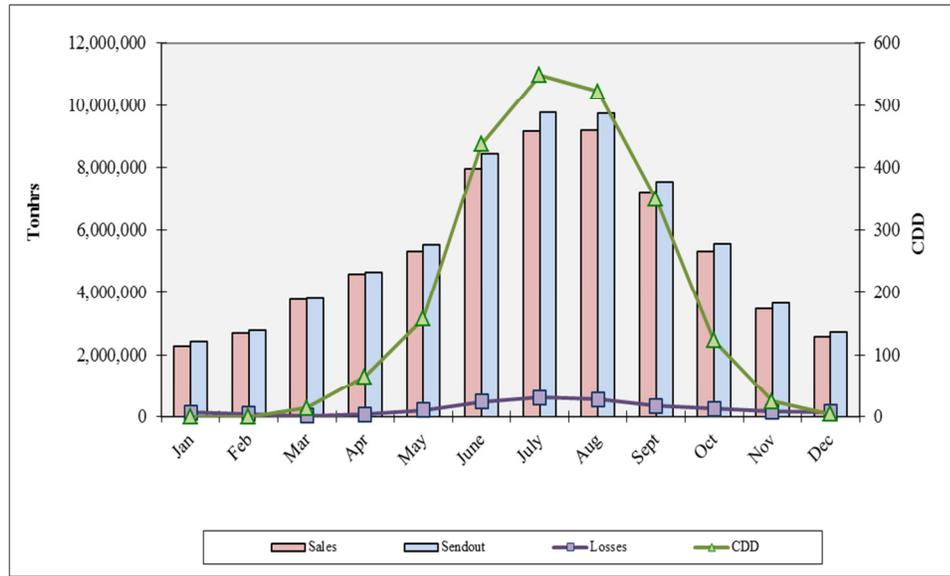


Figure 2. Chilled Water Sales, Sendout, Losses and CDD for the Previous Twelve Months

2. Losses

A comparison of the total, chilled water energy losses in the EDS for the Second Quarter is shown in Figure 3. These losses are the difference in chilled water sendout and sales.

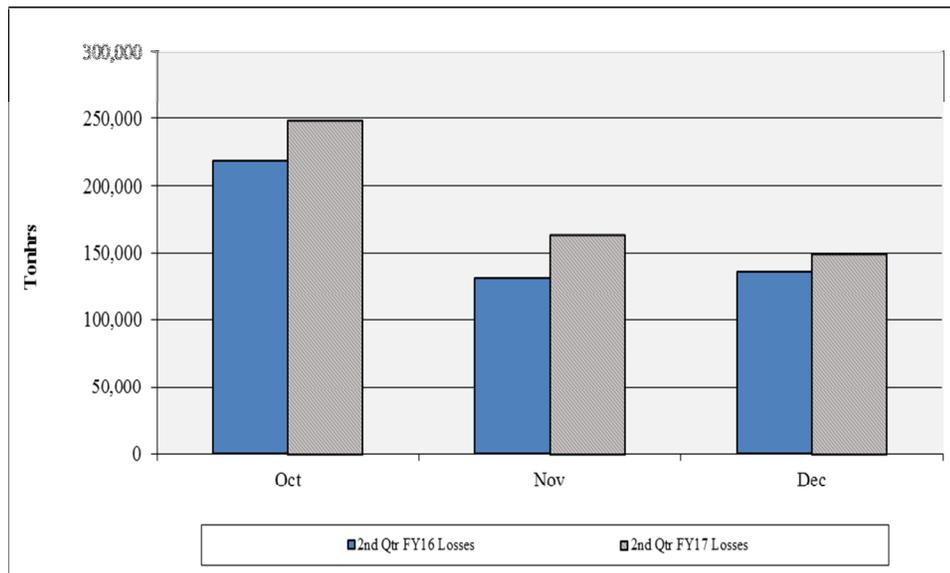


Figure 3. Chilled Water System Loss Comparison

The EDS make-up increased by approximately 38.9% over the previous Second Quarter. CNE is continuing to investigate the sources of the chilled water leaks that cause the increase in EDS make-up. A potential source of a major leak was

discovered on 5th Ave near the James K. Polk Building. A capital project, DES135, was created to perform an exploratory excavation of the area to determine the location of the leak and make the necessary repairs. Unfortunately, the leak could not be located. The total EDS water usage represents approximately 24% of the total EGF water usage for the quarter at its current rate.

The make-up to the cooling towers decreased approximately 4.9% during the quarter. The number of cycles of concentration in the condensing water circuit experienced a 35.5% decrease during the current quarter. The overall city water make-up comparison for the chilled water system is shown in Figure 4.

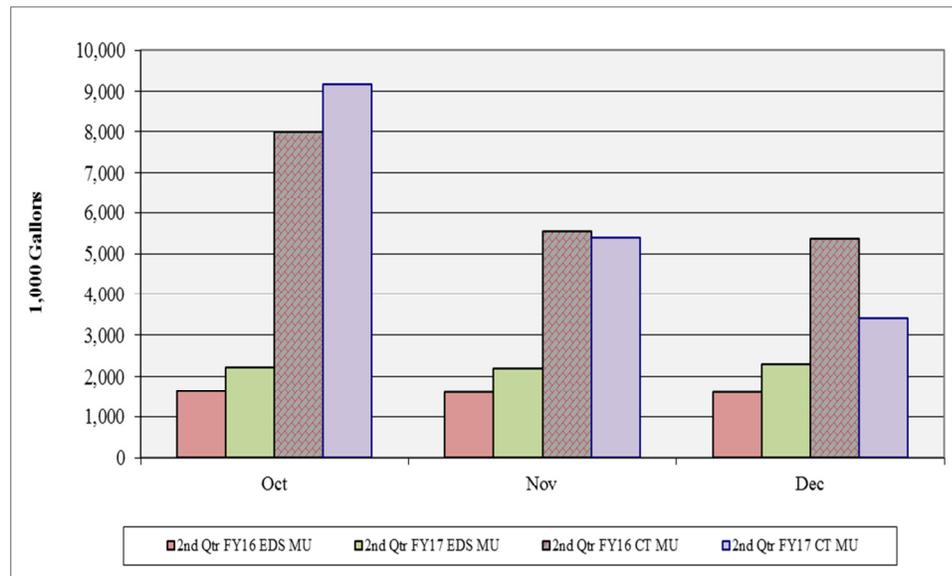


Figure 4. Chilled Water System City Water Usage Comparison

3. Performance

The performance of the chilled water aspect of the EGF is presented by the following two charts, Figures 5 and 6, for the previous twelve months. Under the management of CNE, the System Performance Guarantee levels as described in the ARMA are being achieved quite satisfactorily.

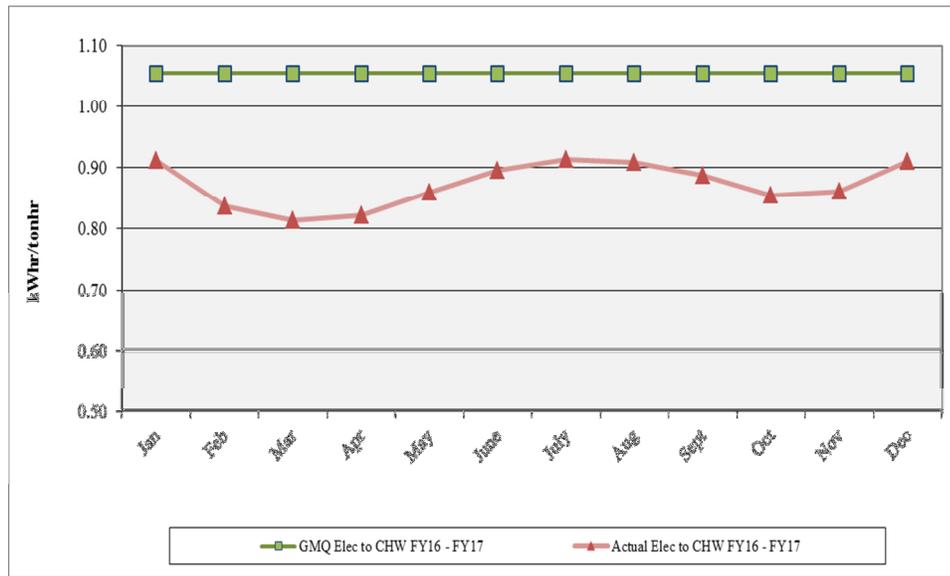


Figure 5. Chiller Plant Electric Performance Guarantee Comparison for the Previous Twelve Months

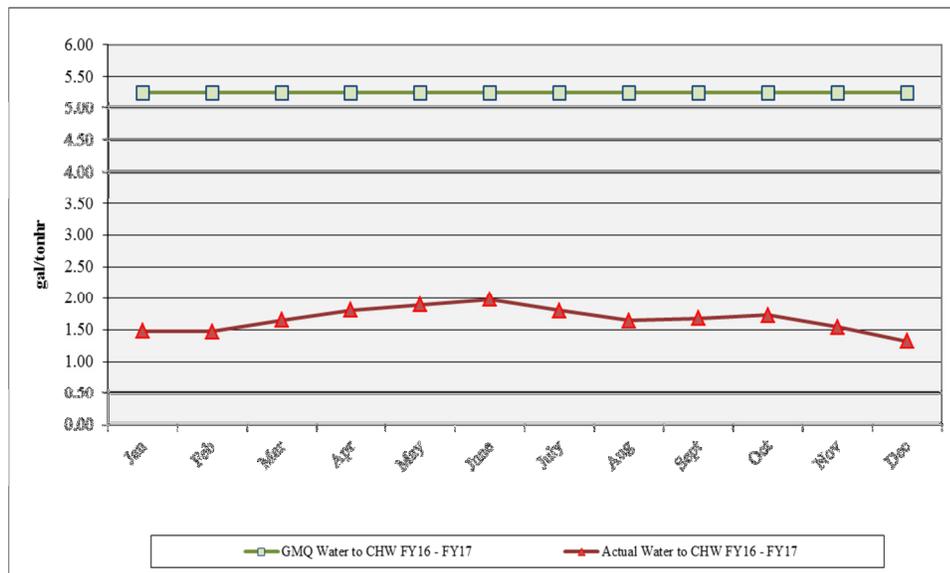


Figure 6. Chiller Plant Water Consumption Performance Guarantee Comparison for the Previous Twelve Months

The chilled water allocation of the electric consumption falls under the GMQ limit of 1.055 kWhr per tonhr for the current quarter, and no excursion is reported for the current fiscal year. The electric usage per unit of sales decreased approximately 0.2% over the Second Quarter for FY16, resulting in a slightly improved performance.

The actual chiller plant water conversion factor increased approximately 1.2% over the previous Second Quarter. The total consumption of city water for the chiller plant for the current quarter increased 4.1%.

B. Steam

1. Sales and Sendout

The steam sendout increased by approximately 17.7% over the previous Second Quarter (FY16), and the sales also increased by approximately 24.3%. The Quarter experienced an approximate 29.6% increase in the number of heating degree days. The steam system losses decreased 16% over the previous Second Quarter. A comparison for the Second Quarter steam sales is shown in Figure 7.

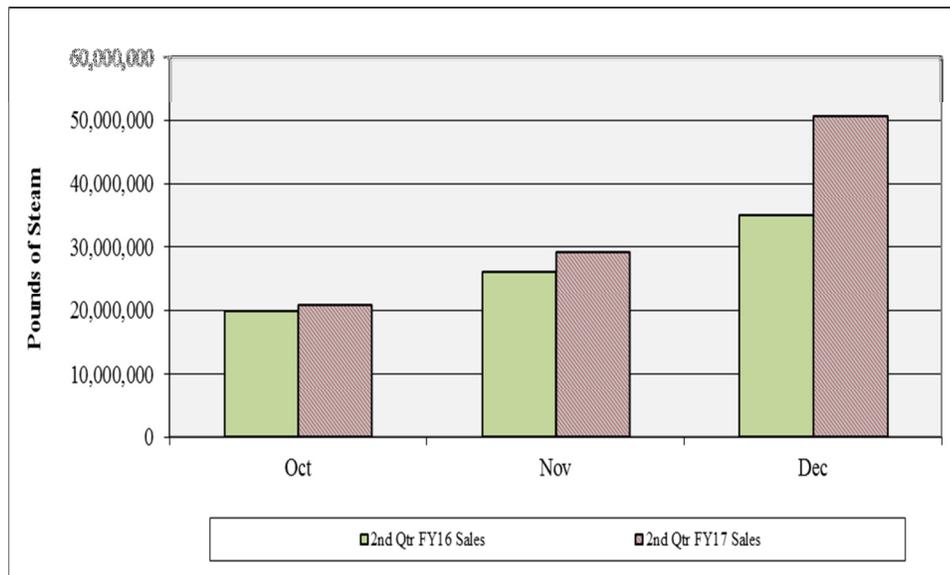


Figure 7. Steam Sales Comparison

The peak steam demand for the current quarter was 126,156 pph, which reflects an approximate 22.4% increase in the peak steam production over the previous Second Quarter.

Figure 8 shows the steam sales, sendout and losses for the previous twelve months. The losses on this figure are defined as the difference in pounds per month between the recorded sendout and sales values and represent the total mass loss in the EDS between the EGF and the customer meters.

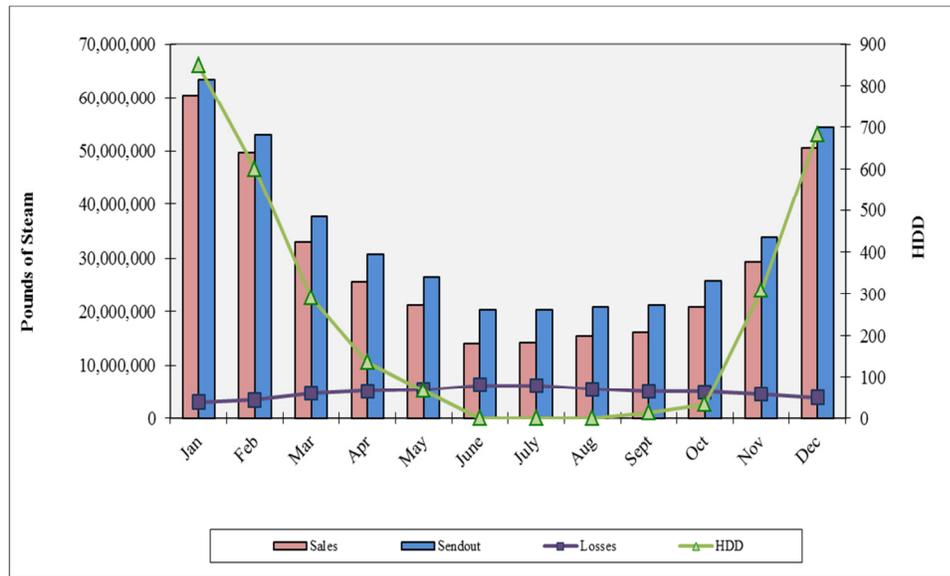


Figure 8. Steam Sales, Sendout, Losses and HDD for the Previous Twelve Months

2. Losses

A comparison of the total steam mass losses in the EDS for the Second Quarter is shown in Figure 9. The mass loss is caused by the heat loss in the EDS between the EGF and the customer meters, resulting in a mass loss at steam traps. Faulty traps, steam leaks or meter error could also be a contributing cause of these losses. Whenever steam sales decrease from the previous quarter, the percent of system losses can be expected to increase since the majority of these losses are based on a near constant heat loss of the system.

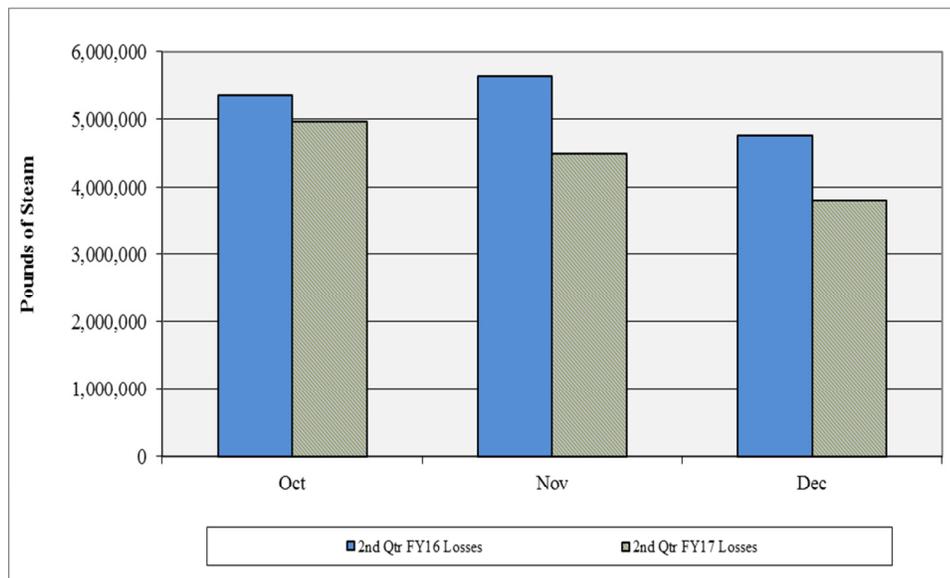


Figure 9. Steam System Losses

The amount of city water make-up (MU) to the steam system consists of the loss in mass between the EGF and the customers, in the condensate return from the customers to the EGF and losses at the EGF. This data is shown in the comparison of Second Quarter data in Figure 10.

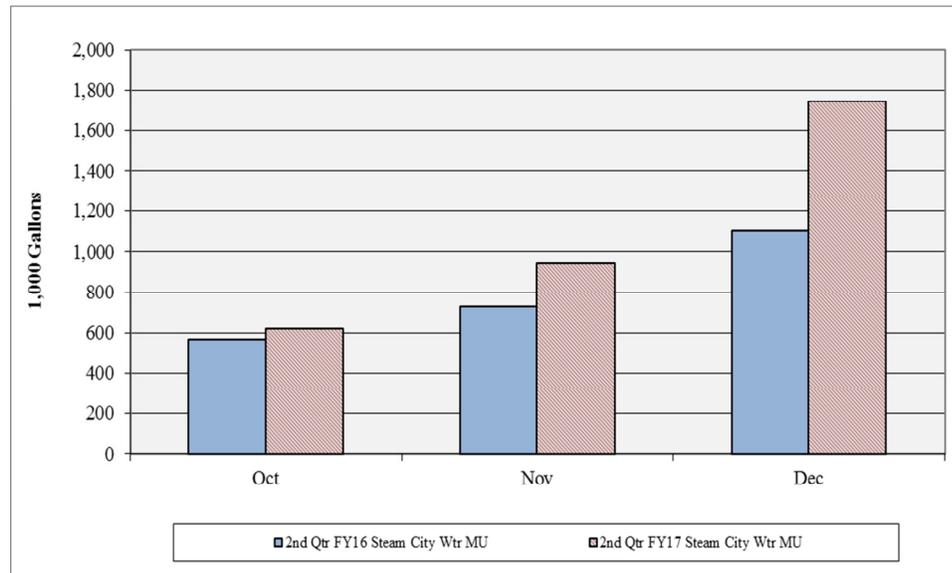


Figure 10. Steam System City Water Make-up Comparison

3. Performance

The performance of the steam system of the EGF is presented by the following three charts, Figures 11, 12 and 13. Under the management of CNE, the System Performance Guarantee levels as described in the ARMA are being achieved satisfactorily.

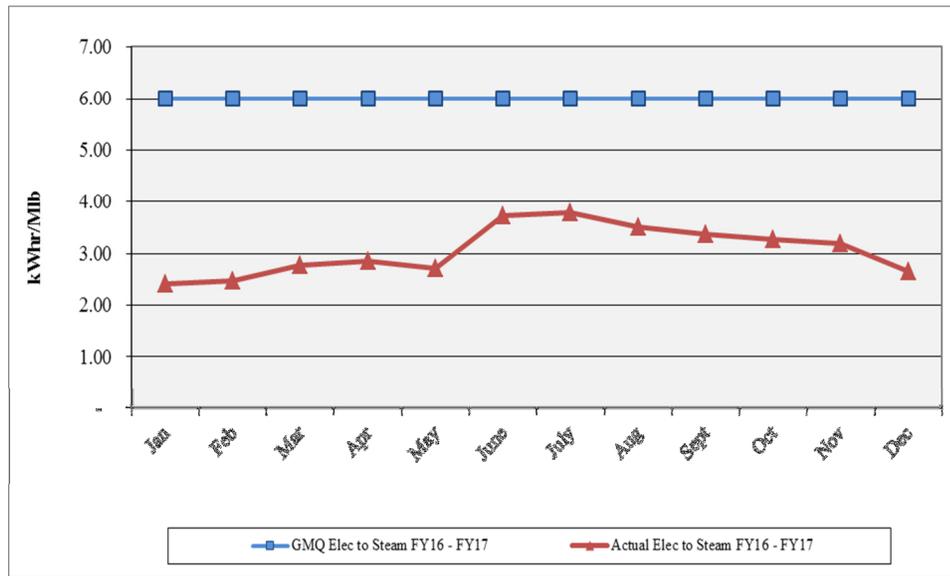


Figure 11. Steam Plant Electric Performance Guarantee for the Previous Twelve Months

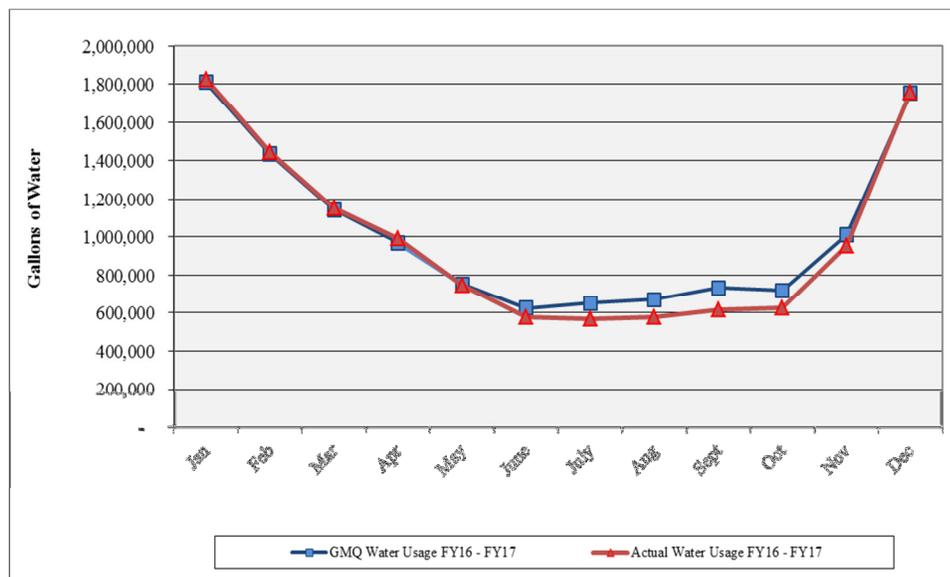


Figure 12. Steam Plant Water Performance Guarantee for the Previous Twelve Months

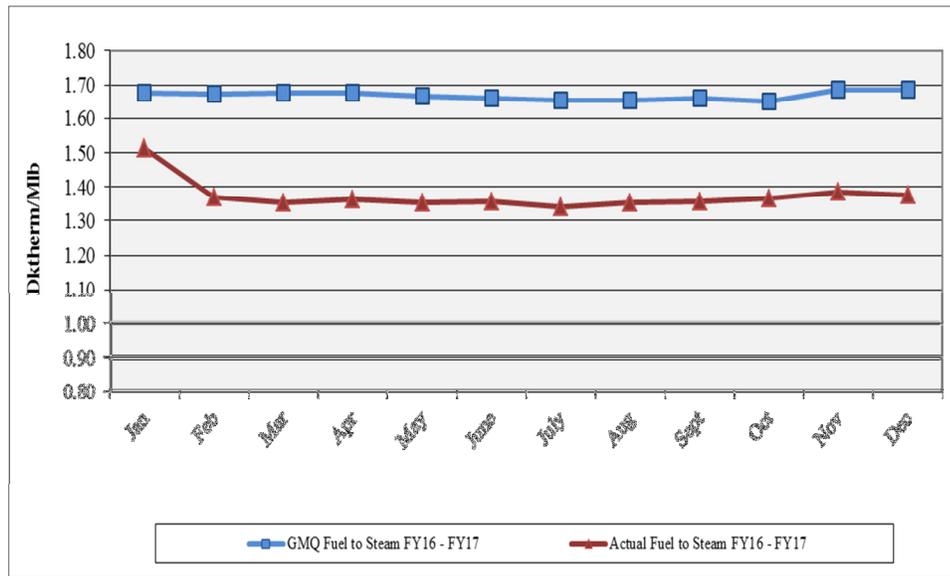


Figure 13. Steam Plant Fuel Performance Guarantee for the Previous Twelve Months

The current quarter experienced a 24.9% increase in the steam plant electric consumption while experiencing an approximate 1% decrease in the electric conversion factor. The water consumption for the steam plant increased 38.2% this quarter as compared to the previous Second Quarter. The fuel consumption per unit of steam sales was 11.4% lower than in the previous Second Quarter due to a mechanical issue with the boilers during December 2015 and January 2016 that was repaired in the Second Quarter FY16. The current EGF fuel efficiency has returned to its historically normal values.

C. Contract Guarantee Performance

The production and sales performance for the EGF and EDS are summarized in Table 1 for the current quarter. Additional parameters, such as cooling tower blow-down and peak demands are listed in this table, as well. Table 2 presents the Second Quarter comparisons of the Guaranteed Maximum Quantities (GMQ) of the criteria commodities (fuel, water and electricity).

Table 1. Second Quarter FY17 and Annual Production, Sales and Consumption Summary

Item	Unit	Second Quarter FY17	Second Quarter FY16	*Percent Difference
	days	92	92	0.00%
Total Electric Use	kWhrs	10,172,634	9,853,022	3.24%
Chilled Water	kWhrs	9,876,277	9,615,831	2.71%
Steam	kWhrs	296,357	237,191	24.94%
Total Water Use	kgal	27,995	26,114	7.20%
Total Chilled Water	kgal	24,687	23,720	4.08%
EDS Make-up	kgal	6,721	4,839	38.89%
Cooling Towers	kgal	17,966	18,881	-4.85%
Calc CT Evaporation	kgal	13,987	15,946	-12.29%
CT Blowdown	kgal	3,979	2,935	35.57%
Calc # Cycles		3.52	5.43	-35.30%
Steam	kgal	3,308	2,394	38.18%
Total Fuel Use	mmBTU	156,901	150,447	4.29%
Natural Gas	mmBTU	156,802	150,439	4.23%
Propane	mmBTU	99	8	1137.50%
Condensate Return	kgal	10,957	9,507	15.26%
	lbs	89,365,280	77,534,404	15.26%
Avg Temp	°F	176.0	176.3	-0.19%
Sendout				
Chilled Water	tonhrs	11,923,500	11,528,700	3.42%
Steam	lbs	114,057,000	96,873,000	17.74%
Peak CHW Demand	tons	14,177	14,083	0.67%
Peak Steam Demand	lb/hr	126,156	103,094	22.37%
CHW LF		38.09%	37.08%	2.74%
Steam LF		40.95%	42.56%	-3.78%
Sales				
Chilled Water	tonhrs	11,361,720	11,042,844	2.89%
Steam	lbs	100,817,579	81,114,853	24.29%
Losses				
Chilled Water	tonhrs	561,780	485,856	15.63%
Steam	lbs	13,239,421	15,758,147	-15.98%
		11.61%	16.27%	-28.64%
Degree Days				
CDD		152	72	111.11%
HDD		1,024	790	29.62%

*positive percent difference values imply an increase from FY16 to FY17

Table 2. Second Quarter FY17 and Annual Performance Guarantee Comparison for Steam and Chilled Water

GMQ Calculations	Unit	Second Quarter FY17	Second Quarter FY16	*Percent Difference
Steam				
GMQ Elec Conversion	kWhr/Mlb	6.00	6.00	
Electric Conversion	kWhr/Mlb	2.94	2.92	0.53%
GMQ Plant Efficiency	Dth/Mlb	1.675	1.672	
Plant Efficiency	Dth/Mlb	1.376	1.553	-11.42%
Actual %CR		78.35%	80.04%	-2.11%
Avg CR Temp	°F	176	176	-0.19%
GMQ Water Conversion	gal	3,481,609	2,726,802	
Water Conversion	gal	3,341,080	2,417,940	38.18%
Chilled Water				
GMQ Elec Conversion	kWhr/tonhr	1.055	1.055	
Electric Conversion	kWhr/tonhr	0.869	0.871	-0.17%
GMQ Water Conversion	gal/tonhr	5.25	5.25	
Water Conversion	gal/tonhr	2.17	2.15	1.16%

*positive percent difference values imply an increase from FY16 to FY17

D. Operating Costs

The fixed operating costs for the DES include the management fee to CNE, debt service payments on the bonds and engineering and administration costs and are charged to the customers relative to their contract demand. The variable costs are dependent on the amounts of steam and chilled water produced and sold to the customers. These latter costs include the utility and chemical treatment costs. The vast majority of the costs incurred for the operation of the DES are passed onto the customers in the form of the demand charges (fixed costs) and energy charges (variable costs). A summary of the total operating costs for the fiscal year to date are shown in Table 3.

The revenues shown reflect the charges to the customers for their respective steam and chilled water service. The difference between the total costs and revenues from the customers is the shortfall that must be paid by Metro. The shortfall exists due to the remaining capacity at the EGF that was included in the original construction and remains unsold and the debt service for bonds to which the customers do not directly contribute.

The system operating costs for FY17 to date are \$11,064,171. This value represents approximately 54% of the total budgeted operating cost for FY17 and includes expenses to date that have been invoiced but were not paid at the time of this report. Additional invoices that would be charged toward the Second Quarter expenses have not been issued or paid at the time of this report. The customer revenues from the sales of steam and

chilled water for FY17 are \$9,231,725 which is approximately 49% of the budgeted amount. The MFA transferred to date is \$861,000 (50% of budget). However, the actual MFA required cannot be accurately calculated due to the outstanding invoices.

Table 3. DES Expenses and Revenues to Date

Item	FY17 Budget	First Quarter Expenses	Second Quarter Expenses	Third Quarter Expenses	Fourth Quarter Expenses	Total Spending to Date	% of Budget
Operating Management Fee							
FOC: Basic	\$ 4,433,800	\$ 1,082,615	\$ 1,082,615	\$ -	\$ -	\$ 2,165,231	48.83%
9th Chiller	\$ 41,500	\$ 10,144	\$ 10,144	\$ -	\$ -	\$ 20,289	48.89%
C/O 6A	\$ 82,000	\$ 20,028	\$ 20,028	\$ -	\$ -	\$ 40,056	48.85%
C/O 6B	\$ 71,800	\$ 17,534	\$ 17,534	\$ -	\$ -	\$ 35,067	48.84%
C/O 7	\$ 27,100	\$ 6,605	\$ 6,605	\$ -	\$ -	\$ 13,211	48.75%
C/O 8	\$ 11,800	\$ 2,891	\$ 2,891	\$ -	\$ -	\$ 5,781	48.99%
Pass-thru Charges:							
Chemical Treatment	\$ 161,600	\$ 49,131	\$ 47,483	\$ -	\$ -	\$ 96,614	59.79%
Insurance	\$ 36,600	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Marketing:							
CNE Sales Activity	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Incentive Payments	\$ 12,800	\$ 3,139	\$ 1,046	\$ -	\$ -	\$ 4,186	32.70%
FEA:							
Steam	\$ 60,500	\$ 15,485	\$ 29,618	\$ -	\$ -	\$ 45,104	74.55%
Chilled Water	\$ 185,200	\$ 142,582	\$ 75,722	\$ -	\$ -	\$ 218,304	117.87%
Misc:							
Metro Credit	\$ -	\$ (243,525)	\$ (141,220)	\$ -	\$ -	\$ (384,745)	n.a.
ARFA	\$ 64,400	\$ 15,723	\$ 15,723	\$ -	\$ -	\$ 31,447	48.83%
Deferral	\$ -	\$ -	\$ (23,446)	\$ -	\$ -	\$ (23,446)	n.a.
Subtotal - Man Fee =	\$ 5,189,100	\$ 1,365,878	\$ 1,285,964	\$ -	\$ -	\$ 2,651,842	51.10%
Reimbursed Management Fee + Chem Treatment		\$ 1,365,878	\$ 1,285,964	\$ -	\$ -	\$ 2,651,842	0.00%
Metro Costs							
Pass-thru Charges:							
Engineering	\$ 9,300	\$ 4,825	\$ 4,936	\$ -	\$ -	\$ 9,762	104.96%
EDS R&I Transfers	\$ 273,700	\$ 68,425	\$ 68,425	\$ 22,808	\$ -	\$ 159,658	58.33%
Metro Marketing	\$ 10,300	\$ 1,274	\$ 579	\$ -	\$ -	\$ 1,854	18.00%
Project Administration	\$ 58,300	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
Metro Incremental Cost	\$ 540,900	\$ 129,303	\$ 121,437	\$ 8,125	\$ -	\$ 258,865	47.86%
Utility Costs:							
Water/Sewer	\$ 553,600	\$ 232,673	\$ 133,296	\$ -	\$ -	\$ 365,969	66.11%
EDS Water/Sewer	\$ -	\$ 136	\$ 90	\$ -	\$ -	\$ 227	n.a.
EDS Electricity	\$ -	\$ 10,853	\$ 7,923	\$ -	\$ -	\$ 18,776	n.a.
Electricity	\$ 5,978,700	\$ 2,080,977	\$ 972,581	\$ -	\$ -	\$ 3,053,557	51.07%
Natural Gas Consultant	\$ 102,000	\$ 3,000	\$ 2,500	\$ -	\$ -	\$ 5,500	5.39%
Natural Gas Transport	\$ -	\$ 48,008	\$ 75,023	\$ -	\$ -	\$ 123,031	n.a.
Natural Gas Fuel	\$ 2,516,100	\$ 234,200	\$ 473,069	\$ -	\$ -	\$ 707,269	28.11%
Propane	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Metro Costs =	\$ 10,042,900	\$ 2,813,675	\$ 1,859,859	\$ 30,933	\$ -	\$ 4,704,467	46.84%
Subtotal - Operations =	\$ 15,232,000	\$ 4,179,553	\$ 3,145,823	\$ 30,933	\$ -	\$ 7,356,310	48.30%
Debt Service							
2012 Bonds	\$ 3,481,500	\$ 870,075	\$ 870,463	\$ -	\$ -	\$ 1,740,538	49.99%
2005 Bonds - Self Funded	\$ 752,300	\$ 687,877	\$ -	\$ -	\$ -	\$ 687,877	91.44%
2007 Bonds - Self Funded	\$ 198,700	\$ -	\$ 198,700	\$ -	\$ -	\$ 198,700	100.00%
2008 Bonds - Self Funded	\$ 197,900	\$ -	\$ 197,900	\$ -	\$ -	\$ 197,900	100.00%
2010 Bonds - Self Funded	\$ 197,600	\$ -	\$ -	\$ 197,600	\$ -	\$ 197,600	100.00%
MCCC Fund - Self Funded	\$ 697,000	\$ -	\$ -	\$ 697,000	\$ -	\$ 697,000	100.00%
Interest & Misc Revenue	\$ (141,200)	\$ (8,380)	\$ (3,373)	\$ -	\$ -	\$ (11,753)	8.32%
MIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Oper. Reserve Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	n.a.
Subtotal - Capital =	\$ 5,383,800	\$ 1,549,573	\$ 1,263,689	\$ 894,600	\$ -	\$ 3,707,862	68.87%
Total =	\$ 20,615,800	\$ 5,729,125	\$ 4,409,513	\$ 925,533	\$ -	\$ 11,064,171	53.67%
Customer Revenues							
Taxes Collected		\$ 104,248	\$ 84,283	\$ -	\$ -	\$ 188,532	n.a.
Taxes Paid		\$ 104,248	\$ 56,743	\$ -	\$ -	\$ 160,991	n.a.
Penalty Revenues/Credits		\$ (24,245)	\$ (14,272)	\$ -	\$ -	\$ (38,517)	n.a.
Energy Revenues Collected		\$ 5,108,490	\$ 4,134,211	\$ -	\$ -	\$ 9,242,701	n.a.
Revenues =	\$ 18,894,000	\$ 5,084,245	\$ 4,147,480	\$ -	\$ -	\$ 9,231,725	48.86%

The DES serves 28 customers and 42 buildings in downtown Nashville. These customers are divided into three categories: 1) Private customers who privately own their buildings, 2) State of TN owned buildings and 3) Metro owned buildings. A summary of the annual costs for each of these three categories is presented in Table 4. These values include late fees and penalties and any unpaid balances.

Table 4. Customer Revenue Summary to Date

Building	Chilled Water			Steam		
	Total Cost	Consumption (tonhrs/yr)	Unit Cost (\$/tonhr)	Total Cost	Consumption (Mlb/yr)	Unit Cost (\$/Mlb)
Private Customers	\$ 1,973,592	11,303,529	\$ 0.1746	\$ 666,058	39,273	\$ 16.9595
State Government	\$ 1,752,521	7,866,889	\$ 0.2228	\$ 794,318	38,243	\$ 20.7704
Metro Government	\$ 3,018,845	17,764,337	\$ 0.1699	\$ 1,037,367	69,077	\$ 15.0176
New Customers	\$ 1,740,218	10,298,321	\$ 0.1690	\$ 626,649	49,895	\$ 12.5595
Total	\$ 6,744,959	36,934,755	\$ 0.1826	\$ 2,497,743	146,593	\$ 17.0386

Total Revenue \$ 9,242,701
 True-up and Adjustments (Net) \$ (10,977)
 Net Revenue \$ 9,231,725

III. EGF Operations

Items relating to the facility operations presented herein are derived from the monthly reports issued by CNE for FY17. Communication between TEG and CNE continues to be excellent, and CNE has reported and managed all EGF operations satisfactorily and according to the ARMA with no contract violations.

A. Reliability

The principle issues surrounding the reliable operation of the EGF relates to the ability to operate without significant interruption, exclusive of planned outages, and disruption of service to the customers. The following disruptions in service occurred during the quarter.

- An issue with the jackshaft on the damper control for the inlet air on boiler #4 caused it to trip on October 13, 2016. Another boiler was placed in service but the header pressure was below normal for approximately 45 minutes with a minimum sendout pressure of 124 psig.
- Boiler #4 tripped on December 8, 2016, due to an issue with the flame scanner. The header pressure was less than 150 psig for 60 minutes with a minimum sendout pressure of 114 psig. The cause of the trip was corrected by CNE.
- Also on December 8, boiler #3 tripped due to a feedwater control valve issue. The steam pressure was below 150 psig for 60 minutes with a minimum sendout pressure of 123 psig. This cause of the trip was corrected by CNE.
- Excursions and disruptions in operations that have occurred throughout the year are included in the individual Monthly Operational Reports from CNE.

B. Efficiency

The operation of the EGF satisfied the guaranteed levels for all commodity usage during the quarter. There were no significant excursions above the guaranteed levels for the current quarter. A more detailed discussion of the contract guarantee performance was presented previously in this report.

C. Environment, Health and Safety

No environmental violations were reported during the quarter.

Monthly safety meetings were held on Storm Water Pollution Prevention Plan, Spill Prevention Controls and Countermeasures, Bloodborne Pathogens, Heat and Cold Stress, and Steam and Refrigeration Systems Safety.

CNE continues cross-training its maintenance employees to fill in as relief operators.

D. Personnel

The EGF currently has twenty-five full time employees. Of the current number of employees, seventeen were previously employed by Nashville Thermal Transfer Corporation.

E. Training

Staff training for this quarter consisted of the Health and Safety training discussed previously. CNE continues cross training maintenance personnel to perform the tasks of the operators at the EGF in case of emergency or need.

F. Water Treatment

The water treatment program consists of regular testing and monitoring of the water chemistry in the steam, chilled water and condensing water systems. Chemicals are added to control the water hardness, chlorine levels and biologicals. Remote testing of the condensate at the AA Birch, Tennessee Tower and the Andrew Jackson also occurs regularly to monitor the concentration and distribution of the steam system chemicals.

- Steam System
 - The condensate return averaged approximately 78.4% of the steam sendout during the quarter which represents a 2.1% decrease over the previous Second Quarter.
 - Feedwater iron and hardness remained excellent during the quarter.
- Condensing Water System
 - The conductivity of the condensing water continues to be normal with only a few excursions resulting in high cycles of concentration and low blowdown rates.
- Chilled Water System
 - CNE continues to monitor and test for the presence of bacteria in the system. The continuous dosage of the biocide continues. At this point, the biological growth in the system has decreased from the original levels measured.

G. Maintenance and EGF Repairs

CNE continues to report on the numerous routine maintenance and preventive maintenance activities performed on the EGF primary and ancillary equipment. The principle items are discussed herein as they relate to the repair, maintenance or replacement of equipment or devices at the facility and are not considered extraordinary. The cost for these items is included as part of the FOCs.

- A leak was repaired on boiler #4 steam drum.
- The east and north side concrete walls of the EGF were pressure washed.
- Condensing water pump #1 motor was re-installed after a being rewound. A new soft start was also installed.
- A new flame scanner was installed on boiler #4.
- A combustion analysis and tuning was performed on boiler #4.
- The fan belts on cooling towers 6, 13 and 18 were tightened.
- Chiller 4B purge unit was replaced.
- A tube leak on boiler #4 was repaired.
- Other minor repairs and maintenance were made during the quarter and are listed in the monthly reports issued by CNE.

H. EGF Walk-through

A quarterly Walk-through of the EGF was performed on January 3, 2017, by Kevin Jacobs, P.E. with TEG. This review involved a tour of the facility with the primary points of interest and concern noted herein.

- Some of the riser pipes in the cooling towers have been painted, but some repairs remain. CNE has dedicated itself to repaint these riser pipes as the tower basins are repaired and the fill is replaced. They estimate a complete restoration of these components over the next couple of winters.
- CNE has made an effort to remove cobwebs within the EGF; however, this removal process is ongoing.
- The items noted in the previous report that required attention from CNE have all been addressed, including pressure washing the exterior of the building.
- Boiler #1 experienced a tube leak during the Second Quarter and was repaired by CNE.
- New graffiti has appeared on the west face of the EGF, even though evidence of the homeless camping in this area has otherwise disappeared. CNE is addressing the graffiti.
- The fencing surrounding the garbage dumpster in the parking lot has begun to show cracks and is in need of repair.

IV. Capital Projects

The Capital Projects discussed in this section are those projects funded through the issuance of bonds by Metro. Costs for these projects will be paid from funds already appropriated. The statuses of the projects are discussed, and the project cost-to-date and bond balances are also presented.

A. Second Quarter FY17 Open Projects

The following projects remained open at the end of the Second Quarter FY17.

1. DES033 – Manhole Lid and Ring Replacement/Restoration

This project relates to the repair and replacement of manhole lids and rings whenever Metro Public Works performs Street re-paving. This project will remain open and on-going.

2. DES090 – Manhole & Tunnel Insulation Repair (Revised from DES060)

Work associated with this project will be on-going as required.

3. DES111 – DES Combined Heat and Power

This project is currently on hold.

4. DES119 - Chilled Water System Delta T Issue

The final test to determine the effectiveness of the Hydroflow device at the Metro Courthouse was performed during the Second Quarter. The device has failed to meet expectations and has not satisfied its “Fit for Purpose” guarantee criteria. CNE will be directed to return the device to the manufacturer for a refund in the Third Quarter.

5. DES121 – Miscellaneous Manhole Repairs

Manhole B2’s insulation was completed during the Second Quarter FY 17. This project is now in close-out.

6. DES122 – Manhole 13 Structural Repairs

Bidding and award of this project was completed during the Second Quarter FY17. Construction will start during the Third Quarter FY17.

7. DES124 - Criminal Justice Center Redevelopment

The work associated with the demolition of the DES services to the CJC building has been completed. The actual demolition of the building by Bell Construction began in the Second Quarter. TEG continues to work with Metro's re-development team in preparation for the re-connection of DES services to the new building once construction is complete.

8. DES128 – Manhole A Sparge Tube Addition

This project was completed during the Second Quarter FY17 and is now in close-out.

9. DES129 – Repair to Manhole 22B

Construction was completed during the First Quarter FY17. The City is seeking reimbursement from the contractor that caused the damage to this manhole and close-out will occur once that takes place.

10. DES130 – Repair to Manhole B3

This repair work was designed, bid and awarded during the Fourth Quarter FY16. Since then, the successful Bidder has closed its Nashville operations. The second lowest Bidder has been contacted and has stated that they will honor their bid time and material not-to-exceed bid price. This work is now being re-assigned and it is anticipated that construction will begin during the Third Quarter FY17.

11. DES134 – 401 Union Building Service Connection

This project was bid and awarded during the Second Quarter FY17. Construction is expected to begin during the Third Quarter FY17.

12. DES135 – CHW Leak at 5th and Union

A chilled water leak was reported by the James K Polk Building on the east side of the building. This project involves locating and repairing this leak. Two separate exploratory excavations took place during the Second Quarter FY17 but no leaks were found. TEG is pursuing the hiring of a different leak detection company to continue searching for the source of this leak

13. DES137 – Cordell Hull New CHW Valves

The Cordell Hull Building is undergoing extensive renovations by the State of Tennessee. In order to perform some of these renovations, The State requested that the chilled water service to the building be isolated. During the isolation

process, CNE discovered that the in-building isolation valves were extremely difficult to operate and achieve isolation. Concerns were raised about the use of these valves in the future. TEG reviewed the valves (which are 40+ years old) and recommended that new valves be installed. Because a substantial portion of the CHW distribution system would have to be drained in order to replace these existing valves, it was decided to install new valves and then abandon-in-place the existing valves.

This project was bid and awarded during the Second Quarter FY17 and construction is expected to take place during the Third Quarter FY17.

B. Second Quarter FY17 Closed Projects

DES131 was closed during the Second Quarter FY17.

C. Capital Projects Budget

The following table summarizes the costs and remaining balance of the DES capital projects based on reported expenditures to date. Open projects or completed projects that require some additional management are shown. Total costs for projects that are closed are shown with a gray highlight. Only the funds currently available are shown.

The \$26,000,000 shown for the bond fund 49116 is only available for the CHP project (DES110). Since this project is currently on hold, the remaining balance of this fund is not available for other projects.

Table 5. Capital Projects Expense Summary

DES Project #	Description	Total Budget	FY16 Spending to Date	Total Spent to Date	Remaining Balance
2010 Bond Projects-49109					
DES119	DES Delta T Issue	\$ 100,000	\$ 4,347	\$ 63,573	\$ 36,427
DES117	Manhole S5 Modifications	\$ 185,000	\$ -	\$ 180,161	\$ 4,839
Total Closed Projects		\$ 2,308,661	\$ -	\$ 2,241,145	\$ 67,517
Metro Project Admin		\$ -	\$ -	\$ -	\$ -
Project Man, Development, etc		\$ 12,254	\$ -	\$ -	\$ 12,254
Total 2010 Bond		\$ 2,605,916	\$ 4,347	\$ 2,484,878	\$ 121,038
Customer Connection Fund-49107					
DES104	Time of Use/ Customer Billing	\$ 40,000	\$ 4,156	\$ 35,924	\$ 4,076
DES124	CJC Redevelopment	\$ 300,000	\$ 100,251	\$ 118,309	\$ 181,691
DES129	MH 22B Repair	\$ 20,000	\$ 3,027	\$ 5,215	\$ 14,785
DES130	MH B3 Repair	\$ 20,000	\$ 2,134	\$ 2,820	\$ 17,180
DES131	Wildhorse CHW Modifications	\$ 40,000	\$ 6,542	\$ 6,542	\$ 33,458
DES133	NCC Development	\$ 20,000	\$ -	\$ 7,425	\$ 12,575
DES134	401 Union Hotel Reconnection	\$ 40,000	\$ 8,818	\$ 8,818	\$ 31,182
Total Closed Projects		\$ 7,233,827	\$ -	\$ 6,614,564	\$ 619,263
Metro Project Admin		\$ 755,173	\$ 16,372	\$ 102,115	\$ 653,058
Project Man, Development, etc		\$ 40,000	\$ -	\$ -	\$ 40,000
Customer Connection Fund		\$ 8,509,000	\$ 141,299	\$ 6,901,734	\$ 1,607,266
CHP and EDS Repairs-49116					
DES111	DES CHP	\$26,000,000	\$ 41,020	\$ 168,706	\$25,831,294
Total Closed Projects		\$ -	\$ -	\$ -	\$ -
Metro Project Admin		\$ -	\$ -	\$ -	\$ -
Project Man, Development, etc		\$ -	\$ -	\$ -	\$ -
CHP and EDS Repairs		\$26,000,000	\$ 41,020	\$ 168,706	\$25,831,294

V. Energy Distribution System Repairs, Improvements, PM and Emergencies

Several EDS repairs and improvements were made during the Second Quarter. The principle items for discussion are presented in the following sections.

A. Repairs and Improvements

Several repairs were made to the EDS and at customer buildings during the quarter. The remaining value of the R&I budget at the end of the current quarter is \$3,548 (including the deposit transfer for January). Table 6 provides a summary of the FY17 expenditures and revenues to date associated with the R&I budget.

Table 6. Repair and Improvement Expenditure and Revenue Summary

Description	Date	Tracking #	Vendor	Expenditure	Transfers	Net Market Adjustment	Market Value	Balance	paid from Trustee Date
Value at end of FY16						\$ -	\$ 5,067.65	\$ 5,067.65	
June R&I Invoice	8/29/2016	DES-2337	CNE	\$ 1,803.70					9/1/2016
DES-126 Exploratory Excavation on 3rd Ave 6/14	8/30/2016	DES-2338	CNE	\$ 25,520.61					9/1/2016
DES-121 Misc MH Repairs	9/7/2016	DES-2340	TEG	\$ 1,360.85					9/12/2016
DES-126 Exploratory Excavation on 3rd Ave 6/14	9/7/2016	DES-2340	TEG	\$ 243.96					9/12/2016
DES-127 MH13 Steam Anchor Repair	9/7/2016	DES-2340	TEG	\$ 813.19					9/12/2016
DES-128 MHA Sparge Tube	9/7/2016	DES-2340	TEG	\$ 160.10					9/12/2016
July R&I Invoice	9/27/2016	DES-2354	CNE	\$ 2,963.68					10/5/2016
DES-121 Misc MH Repairs	9/27/2016	DES-2353	CNE	\$ 33,558.75					10/5/2016
DES-121 Misc MH Repairs	10/27/2016	DES-2370	TEG	\$ 744.63					10/28/2016
DES-122 MH13 Repairs	10/27/2016	DES-2370	TEG	\$ 480.30					10/28/2016
DES-127 MH13 Steam Anchor Repair	10/27/2016	DES-2370	TEG	\$ 1,796.69					10/28/2016
DES-128 MHA Sparge Tube	10/27/2016	DES-2370	TEG	\$ 320.21					10/28/2016
DES-124.3 MH-D Sump Pumps	10/27/2016	DES-2370	TEG	\$ 120.08					10/28/2016
DES-135 CHW Leak at 5th and Union	10/27/2016	DES-2370	TEG	\$ 80.06					10/28/2016
DES-121 Misc MH Repairs	10/28/2016	DES-2372	TEG	\$ 480.31					11/1/2016
DES-122 MH13 Repairs	10/28/2016	DES-2372	TEG	\$ 2,477.56					11/1/2016
DES-127 MH13 Steam Anchor Repair	10/28/2016	DES-2372	TEG	\$ 80.06					11/1/2016
DES-128 MHA Sparge Tube	10/28/2016	DES-2372	TEG	\$ 720.46					11/1/2016
DES-124.3 MH-D Sump Pumps	10/28/2016	DES-2372	TEG	\$ 720.46					11/1/2016
DES-135 CHW Leak at 5th and Union	10/28/2016	DES-2372	TEG	\$ 2,855.66					11/1/2016
Sub-Total First Quarter				\$ 77,301.32	\$ 68,424.99	\$ -	\$ (8,876.33)	\$ (8,876.33)	
Sept R&I Invoice	11/23/2016	DES-2385	CNE	\$ 1,677.24					
Oct R&I Invoice	12/22/2016	DES-2398	CNE	\$ 4,886.62					12/29/2016
DES 121 Misc Manhole Repairs	12/22/2016	DES-2399	CNE	\$ 11,186.25					12/29/2016
DES-124.3 MH-D Sump Pumps	1/6/2017	DES-2403	CNE	\$ 38,981.25					
DES-127 MH13 Steam Anchor Repair	1/6/2017	DES-2404	CNE	\$ 27,145.00					
Sub-Total Second Quarter				\$ 83,876.36	\$ 68,424.99	\$ -	\$ (15,451.37)	\$ (15,451.37)	
Sub-Total Third Quarter				\$ -	\$ 22,808.33	\$ -	\$ 22,808.33	\$ 22,808.33	
Sub-Total Fourth Quarter				\$ -	\$ -	\$ -	\$ -	\$ -	
FY17 Year to Date				\$ 161,177.68	\$ 159,658.31	\$ -	\$ 3,548.28	\$ 3,548.28	

B. Preventive Maintenance

Preventive maintenance, tunnel and manhole inspections and reviews of customers' mechanical rooms were performed during the quarter. The principle items for discussion are presented.

1. EDS Manhole Inspections
 - a. Some traps were found not to be functioning properly; CNE is continuing to repair or replace traps in the system, however some of these repairs/replacements require a partial or system-wide outage.
 - b. Some of the trap-piping strainers do not have blowdown valves installed. These valves need to be installed to permit maintenance personnel to discharge any debris from the trap piping that can cause the traps to fail.
 - c. Structural metal in the vaults and tunnels need to be cleaned and painted or replaced.
 - d. Spalled concrete needs to be repaired in some manholes.
 - e. Some minor insulation repairs are needed in some vaults.
 - f. Mud and debris needs to be removed from some manholes.
2. Other EDS Inspections
 - a. Minor items are included in the CNE monthly reports.

C. Emergencies

No emergencies were reported during the quarter.

D. EDS Walk-through

Due to the holidays, personnel vacations and weather, an EDS walkthrough was not conducted this quarter. The EDS walkthrough will resume next quarter.

VI. Customer Relations

This section contains descriptions of the marketing efforts made by the DES Team during the quarter. The topics of interactions, meetings and training seminars with the customers are also discussed. There are currently 28 customers, comprised of 41 different buildings, connected to the EDS. Service to each of these buildings continues to prove satisfactory, and the responsiveness to customer issues is handled by CNE in an excellent and professional manner.

A. Marketing

The DES has placed a temporary hold on active marketing at this time due to the uncertainty of the anticipated steam and chilled water loads on the reconstructed Criminal Justice Center and due to the higher than normal system temperature differences that may be related to the chilled water chemistry. TEG and CNE continue to monitor the system temperature difference issue and make recommendations to Metro regarding the availability of any additional capacity.

There have been no additional meetings or discussions with the engineers and developers of the re-development of the “old” Convention Center during the quarter.

The Wells Fargo building is currently under redevelopment as a hotel. This building is anticipated to remain a DES customer.

The 401 Union Building is anticipated to be reconnected as a hotel during the Fourth Quarter FY17. TEG and CNE remain in contact with the contractors and owner.

TEG met with the Hastings Architects in December to discuss options for service from DES to potential developments across Peabody St (directly south of the EGF) and east of the plant. The developments could become mixed use high rise buildings that may require DES services.

B. Customer Interaction

The CNE customer service representative (CSR) continues to respond to customer issues as they arise. Much of the communication involves minor problems with the customers’

heating and cooling systems that are unrelated to DES service. Other more significant issues are summarized herein.

- CNE's CSR was in contact with the personnel of several customer buildings to discuss leaks or potential leaks and building performance during the quarter.
- A meeting with the contractors for the Wells Fargo building renovation was held. It was discovered that the contractor had connected the chilled water service for a new air handling unit upstream of the DES chilled water meter.
- Other minor issues and customer interactions are noted in the monthly CNE reports.

VII. Recommendations

Based on the review of the Second Quarter FY17 EGF and EDS operations, the following recommendations are made.

- Corroded structural steel within the vaults and tunnels should be cleaned and painted or replaced; TEG will continue to coordinate this effort with CNE.
- Insulation which is absent, or in disrepair, in the vaults should be addressed through either additional capital projects, which include work within these vaults, or through DES090.
- Steam traps which need repair or replacement should be addressed as soon as possible.
- Concrete repairs need to be made in some manholes. TEG will continue to coordinate this effort with CNE.
- Mud and debris needs to be cleaned from some manholes.